REMARKS/ARGUMENTS

Claims 1-35 are currently pending in this application. Claims 1, 9, 16, 18 and 25 have been amended to more particularly and distinctly claim the subject matter of the present invention. Applicants submit that no new matter has been added by the amendment herein.

Double Patenting Rejection

Claims 1-35 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-36 of co-pending U.S. Patent Application No. 10/731,760. A Terminal Disclaimer is submitted herewith to overcome the obviousness-type double patenting rejection. The withdrawal of the double patenting rejection is respectfully requested.

Claim Rejections - 35 USC § 102(e)

Claims 1-4, 16, 18-20, 24-29, 31 and 32 have been rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Application No. 2004/0204108 by Etkin et al. (hereinafter "Etkin"). Applicants respectfully disagree.

With respect to claim 1, the Examiner asserts that Etkin discloses measuring an error in the alignment of the beams as the base station transmits signals to the mobile stations. Applicants respectfully disagree.

Etkin is not related to alignment of beams emanating from two communicating entities. Etkin is directed to adjustment of beam width and induced SNR fluctuations in accordance with the number of mobile stations in a sector to maximize the throughput of the base station. Etkin discloses as follows:

> the invention comprises systems and methods for controlling various parameters of an antenna array ... as a function of the number of mobile stations in a sector...
>
> The beam width ... has important effects on sector throughput. These effects depend on the number of mobile stations... there is an optimum beam width that maximizes the sector throughput.
>
> The rate of induced SINR fluctuations also has important effects on the overall base station throughput, and these effects depend on the number of mobile stations as well. ... Fast induced SINR fluctuations cause a degradation in SINR prediction in mobile stations resulting in lower data rate, ... from a prediction point of view, the induced SINR fluctuation should be as slow as possible.
>
> a method comprises identifying the number of mobile stations that are communicating with a base stations and then selecting a fluctuation rate and beam width for the antenna gain pattern ...

(See paragraphs 0020, 0023, 0024 and 0030, emphasis added). In Etkin, a base station adjusts a beam width and SINR fluctuations based on the number of mobile stations in a sector served by the base station. Etkin discloses that for a small number of users a broader beam is better whereas a highly directional beam is better for large number of users. The disclosure in Etkin (paragraph 0049) cited by the Examiner is not related to a measurement of an error in alignment (i.e., the

degree of misalignment) of two beams from two communicating entities, but just an effect of beam sweeping by the base station. The cited portion reads as follows.

> The strength of the signal received by each of the mobile stations 14 will vary as the beam transmitted by the base station 12 sweeps through the sector 10. Each mobile station 14 periodically computes the SINR level of the received signal and transmits the corresponding DRC information to the base station 12.

(See paragraph 0049). Etkin fails to disclose a scheme of measuring an error in alignment of two beams emanating from two communication entities and readjusting the beams to realign the two beams.

Moreover, in claim 1 of the present invention, two communicating entities do not communicate beam forming information not only during the initial stage before beam forming operation but throughout the communication process. Both entities do not know whether the other is adjusting a beam direction for fixing the misalignment of the two beams. In such a situation, there is a possibility of oscillation caused by simultaneous adjustment by the two entities. In order to avoid this oscillation, only one entity is selected to adjust its beam in order to realign the beams in claim 1 of the present invention.

In contrast, in Etkin, the two communicating entities, (i.e., a base station and a mobile station), communicate with each other and the base station adjusts the beam width and induced SINR fluctuations based on the reported data rate control (DRC) from the mobile stations. Etkin discloses as follows:

> As the base station 12 transmits signals ... each of the mobile stations 14 ... receive the signal and computes a SINR. The mobile station 14 then selects a corresponding data rate that can be supported and transmits this requested data rate information to the base station 12 over the reverse link DRC (data rate control) channel. (Emphasis added).
>
> The base station 12 is configured to identify the mobile stations 14 in the sector 10 based upon the DRCs transmitted to the base station 12 by the mobile stations 14. The base station 12 then determines the fluctuation rate and the beam width based on the number of mobile stations 14 in the sector 10 ...

(See paragraphs 0049 and 0051). In Etkin, the base station constantly receives DRC signals from the mobile station, and makes adjustments on the beam width and fluctuations based on the reports from the mobile stations. In contrast, in claim 1 of the present invention, two communication entities do not communicate beam adjustment information. The selected entity adjusts its own beam without receiving any information for beam adjustment from the other entity. Therefore, claim 1 is clearly distinguishable from Etkin.

With respect to claims 16, 18, 25 and 31, as presented with respect to claim 1, Etkin fails to disclose a scheme of measuring an error in the alignment of two beams emanating from two communication entities and adjusting a parameter for adjusting the beams in order to realign the two beams. Therefore, claims 16, 18, 25 and 31 are not anticipated by Etkin for the same reason stated above.

Claims 2-4, 19, 20, 24, 26-29 and 32 are dependent claims of claims 1, 18, 25 and 31, respectively. Therefore, it is believed that these dependent claims are also allowable for the same reason stated above.

Claim Rejections - 35 USC § 103(a)

Claim 5 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Etkin in view of the Examiner's taking of official notice that use of a fraction of 0.5 is well known in the art. Claims 6-8 and 21-23 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Etkin in view of U.S. Patent No. 6,225,961 to Benjauthrit (hereinafter "Benjauthrit"). Claims 9-15, 24, 33-35 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Etkin in view of U.S. Patent No. 6,665,545 to Raleigh et al. (hereinafter "Raleigh"). Claim 17 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Benjarthrit in view of Raleigh.

With respect to claim 5, claim 5 is a dependent claim of claim 1. Etkin fails to disclose a scheme of measuring an error in the alignment of two beams and adjusting a beam in accordance with the error in order to realign the two beams as stated above with respect to claim 1. Therefore, claim 5 is clearly distinguishable from Etkin.

With respect to claims 6-8 and 21-23, as presented with respect to claim 1, Etkin fails to disclose measurement of the degree of misalignment of two beams, but merely discloses adjustment of beam width and SINR fluctuation in accordance

with the number of mobile stations. Since the main reference, Etkin, is clearly distinguishable from claims 6-8, claims 6-8 are allowable over Etkin in view of Benjauthrit.

With respect to claim 9, Etkin fails to disclose a scheme of measuring an error in alignment of two beams and adjusting beams by each communicating entity according to their correction factor in order to realign the two beams. Therefore, claim 9 is clearly distinguishable from Etkin, and the corresponding dependent claims 10-15 are also allowable for the same reason.

With respect to claims 24 and 33-35, these claims are dependent claims of claim 18 and 31. Therefore, it is believed that claims 24 and 33-35 are also allowable for the same reason stated above.

With respect to claim 17, Benjauthrit discloses a method for compensating planetary aberration in antenna beam tracking of spacecraft. The problem addressed by Benjauthrit is that effective communication with relatively distant spacecraft is complicated by planetary aberration which is caused by relative motion between the spacecraft and the antenna and a round trip time for the uplink and downlink signals to travel between the spacecraft and the antenna. In order to solve the problem, Benjauthirt discloses a method for steering a receive beam to a past position where the spacecraft was half a round trip light travel time (RTLT) prior to the present time, and steering a transmit beam to a future position where

the spacecraft will be half the RTLT after the present time. Benjauthirt resolves the problem by splitting the receive and transmit beam to align to the respective position of the spacecraft.

Benjauthrit, however, fails to disclose a scheme of selecting a correction factor for each communicating entity, measuring an error in the alignment of the two beams emanating from the two entities, and adjusting the beam of each entity according to the corresponding correction factor. In Benjauthrit, only the antenna located on the ground adjusts beams to receive and transmit signals compensating for the planetary aberration, and the spacecraft does not adjust the beam direction. In contrast, in the claimed invention, two communicating entities correct errors in beam alignment according to a correction factor selected for each communicating entity. Moreover, in Benjauthrit, what is measured and compensated is the planetary aberration, not the error in alignment of the two beams emanating from the antenna and the spacecraft. In contrast, in the claimed invention, what is measured and compensated for is an error in alignment of the two beams emanating from the two communicating entities. Therefore, Benjauthrit is clearly distinguishable from claim 17.

Conclusion

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a

telephone interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing remarks, Applicants respectfully submit that the present application is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

Goldberg et al.

By _____
John C. Donch, Jr.
Registration No. 43,593
(215) 568-6400

Volpe and Koenig, P.C.
United Plaza, Suite 1600
30 South 17th Street
Philadelphia, PA 19103
Telephone: (215) 568-6400
Facsimile: (215) 568-6499

JCD/YBH/dmr